

FORM PTO-1390
(REV 10-94)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

9320.93USWO

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371U.S. APPLICATION NO. (if known, see 37 CFR 1.5)
Unknown 09/462376

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR98/01520	July 10, 1998	July 11, 1997

TITLE OF INVENTION
DATA SIGNAL FOR MODIFICATION OF A GRAPHIC SCENE WITH CORRESPONDING METHOD AND DEVICE

APPLICANT(S) FOR DO/EO/US
Julien M. SIGNES

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
 2. This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
 3. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
 4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 a. is transmitted herewith (required only if not transmitted by the International Bureau).
 b. has been transmitted by the International Bureau.
 c. is not required, as the application was filed in the United States Receiving Office (RO/US)
 6. A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 a. are transmitted herewith (required only if not transmitted by the International Bureau).
 b. have been transmitted by the International Bureau.
 c. have not been made; however, the time limit for making such amendments has NOT expired.
 d. have not been made and will not be made.

8. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. An unsigned oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

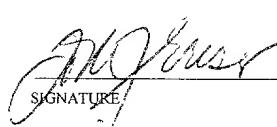
12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. A FIRST preliminary amendment.
 A SECOND or SUBSEQUENT preliminary amendment.

14. A substitute specification.

15. A change of power of attorney and/or address letter.

16. Other items or information: EPO International Search Report: Form PCT/ISA/220; 9 cited references; Form 1449

U.S. APPLICATION NO (If known, see 37 CFR 1.5) Unknown 09/462376	INTERNATIONAL APPLICATION NO PCT/FR98/01520	ATTORNEY'S DOCKET NUMBER 9320.93USWO		
17. [X] The following fees are submitted:		CALCULATIONS PTO USE ONLY		
BASIC NATIONAL FEE (37 CFR 1.492(a) (1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....\$970.00				
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....\$840.00				
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$760.00				
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)\$670.00				
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)\$96.00				
ENTER APPROPRIATE BASIC FEE AMOUNT =		\$840.00		
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$0		
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	9	-20 = 0	X \$18.00	\$0
Independent claims	3	-3 = 0	X \$78.00	\$0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$260.00	\$0	
TOTAL OF ABOVE CALCULATIONS =		\$840.00		
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).		\$0		
SUBTOTAL =		\$840.00		
Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		+ \$0		
TOTAL NATIONAL FEE =		\$840.00		
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+ \$0		
TOTAL FEES ENCLOSED =		\$840.00		
		Amount to be: refunded	\$0	
		charged	\$0	
<p>a. [X] Check(s) in the amount of <u>\$840.00</u> to cover the above fees is enclosed.</p> <p>b. [] Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>13-2725</u>.</p>				
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.				
SEND ALL CORRESPONDENCE TO John J. Gresens MERCHANT & GOULD P.C. 3100 Norwest Center 90 South Seventh Street Minneapolis, MN 55403				
 SIGNATURE John J. Gresens NAME				
33,112 REGISTRATION NUMBER				

09/462376

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
428 Rec'd PTO/PTO

07 JAN 2000

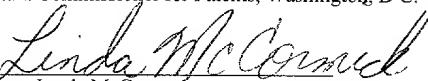
Applicant: SIGNES
 Docket: 9320.93USWO
 Title: DATA SIGNAL FOR MODIFICATION OF A GRAPHIC SCENE WITH CORRESPONDING METHOD AND DEVICE

CERTIFICATE UNDER 37 CFR 1.10

'Express Mail' mailing label number EL415941730US

Date of Deposit: January 7, 2000

I hereby certify that this paper or fee is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

By 
 Name Linda McCormick

BOX PCT PATENT APPLICATION
 Assistant Commissioner for Patents
 Washington, D.C. 20231

Sir:

We are transmitting herewith the attached:

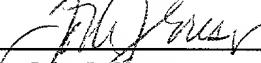
- Transmittal sheet, in duplicate, containing Certificate under 37 CFR 1.10.
- National Stage PCT Patent Application: Spec. 15 pgs; 8 claims; Abstract 1 pg.
 The fee has been calculated as shown below in the 'Claims as Filed' table.
- 4 sheets of formal drawings
- Information Disclosure Statement, Form 1449, 9 References
- An unsigned Combined Declaration and Power of Attorney
- A check in the amount of \$840.00 to cover the Filing Fee
- Other: Preliminary Amendment; International Search Report; Form PTO-1390
- Return postcard

CLAIMS AS FILED

Number of Claims Filed	In Excess of:	Number Extra	Rate	Fee
Basic Filing Fee				\$840.00
Total Claims				
8	- 20	= 0	x 18.00	=\$0.00
Independent Claims				
3	- 3	= 0	x 78.00	=\$0.00
MULTIPLE DEPENDENT CLAIM FEE				\$0.00
TOTAL FILING FEE				\$840.00

Please charge any additional fees or credit overpayment to Deposit Account No. 13-2725. A duplicate of this sheet is enclosed.

MERCHANT & GOULD P.C.
 3100 Norwest Center, Minneapolis, MN 55402
 (612) 332-5300

By: 
 Name: John J. Gresens
 Reg. No.: 33,112
 Initials: JJG:tvm

09/462376

428 Rec'd PCT/PTO 07 JAN 2000

S/N Unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

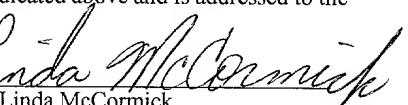
Applicant:	SIGNES	Examiner:	Unknown
Serial No.:	Unknown	Group Art Unit:	Unknown
Filed:	January 7, 2000	Docket No.:	9320.93USWO
Title:	DATA SIGNAL FOR MODIFICATION OF A GRAPHIC SCENE WITH CORRESPONDING METHOD AND DEVICE		

CERTIFICATE UNDER 37 CFR 1.10

'Express Mail' mailing label number: EL145941730US

Date of Deposit: January 7, 2000

I hereby certify that this correspondence is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

By: 
Name: Linda McCormick

PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment.

IN THE SPECIFICATION

A courtesy copy of the present specification is enclosed herewith. However, the World Intellectual Property Office (WIPO) copy should be relied upon if it is already in the U.S. Patent Office.

IN THE CLAIMS

In claim 4, line 29, delete "any one of Claims 2 and 3" and insert—Claim 2—

In claim 5, line 3, delete "any one of Claims 2 to 4" and insert—Claim 2—

In claim 6, line 14, delete "any one of Claims 1 to 5" and insert—Claim 1—

REMARKS

The above preliminary amendment is made to remove multiple dependencies from claims 4 , 5 and 6.

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

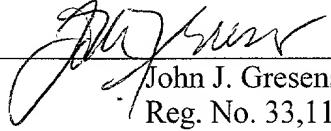
If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, John J. Gresens (Reg. No. 33,112), at (612) 371.5265.

Respectfully submitted,

MERCHANT & GOULD P.C.
3100 Norwest Center
90 South Seventh Street
Minneapolis, Minnesota 55402
(612) 332-5300

Dated: January 7, 2000

By



John J. Gresens
Reg. No. 33,112

4/PK5

Data signal for modification of a graphic scene with
corresponding method and device

The field of the invention is that of the restitution of animated graphic scenes, for example, on a multi-media terminal. More precisely, the invention relates to the modification of animated scenes, that is to say, the carrying out 5 of point changes, remotely commanded, for example, by a remote server, of a graphic scene restituted on a terminal.

By graphic scene, here one understands the layout of graphic objects, video and picture in time and in space. Such 10 graphic scenes can be in two or in three dimensions, and contain various types of graphic primitives.

The invention finds applications in all cases where it may be necessary to modify the structure of a graphic scene or of an element making it up.

Hence, the invention can be used in a large number of 15 advanced multi-media applications. In particular, the invention can be advantageously applied to

- advanced digital television and communications services in which messages may be exchanged in graphic form. It is, for example, possible to add messages in video 20 form to set up a video-conference by superimposing a traditional digital video. Advertising messages or logos can also be added to an existing scene ;
- multi-user applications in which a point modification of a scene can be made remotely. For example, it is possible to consider adding a new "message" in graphic 25 form on one or more remote terminals. It is also possible to replace certain objects, or to indeed replace the entire scene ;
- multi-media consultation services using 2D or 3D 30 graphic objects.

Description formats of graphic scenes are already known. Hence the ISO/IEC DIS 14772-1 Standard describes the VRML

2.0 format. The MPEG-4 standardization group has also defined a scene description format called BIFS (Binary Format for Scene) which was inspired by VRML 2.0. The BIFS format is notably introduced in “The MPEG-4 Systems Verification Model” (ISO/IEC JTC1/SC29/WG 11-N1693, MPEG 97, April 1997).

This scene description format has the aim of describing the space-time relationships between the various graphic objects of a scene. To do this, it defines a certain number of nodes, or objects, representing all the graphic primitives that one wishes to represent. Each of these nodes include pre-defined fields which represent the characteristics of these nodes.

In other words, the BIFS format allows the transmission of a scene structure in the form of a parametric description or a script.

The disadvantage of this technique is that, if it is providing the animation of a graphic scene, it does not permit remote modification of it. For example, it is not possible to add a new object, to delete from it or to add another object etc. These functions are nevertheless necessary, particularly in the applications considered above.

The format called “External Authoring Interface” (which can be referred to on the server <http://www.sgi.com>) is already known and proposes modifying the parameters of the scene using an interface standardized in "Java" (registered trade mark) language.

It is also possible to pre-program the changes in the scene by connections between fields, which are mechanisms for the passage of events, called “ROUTES” in VRML and in BIFS format described by the MPEG-4 group. The “ROUTES” allow one to define the connections in such a way that, when a first field changes in value, the second field to which it is connected by a “ROUTE” also takes the same value.

However these two methods have major disadvantages:

- the “external API” is used to modify the VRML scene using an application in “Java” language. This “Java” application can be downloaded from a server. However this method has the following two disadvantages :
 - 5 • downloading a “Java” class is expensive in terms of transmission resources ;
 - this mode assumes that any terminal implementing this mechanism contains a virtual “Java” machine. The demands on the terminal are therefore high
- 10 - in addition, both methods assume that the modification parameters of a scene are known a priori. Obviously this is not the case during use of animation in a communication application.

The MPEG-4 system has developed a first version of a
15 scene up-date format, but it is neither complete nor optimized.

Yet other techniques are known, such as D-VRML described by ARIKAWA. However, they remain restricted to modifying a pre-existing original scene and only allow a limited number of applications (as will be seen more clearly in what
20 follows, the recognition of this problem is, in itself, a part of the invention).

A purpose of the invention is notably to remedy these disadvantages of the state of the technology.

More precisely, a purpose of the invention is to provide a
25 data signal, as well as a method and a device for using it, which allow simple remote modification to be carried out and which consume little in terms of transmission resources for any type of graphic scene.

In other words, a notable objective of the invention is to
30 provide a technique for the remote modification of graphic scenes which responds to at least one of the following criteria :

- simplicity in editing and interpreting the data;
- low memory consumption and low consumption of transmission resources;

- capability of modifying any type of object and any type of graphic scene;
- possibility of modifying objects, or nodes in any fashion whatsoever, that is to say non-predefined.

5 Another purpose of the invention is to provide a technique that allows the creation of simple and inexpensive multi-media terminals, that is to say terminals that do not necessitate either large calculation means or large data memory means.

10 A further objective of the invention is to provide a technique, capable of functioning on low bit rate transmission networks.

Another objective of the invention is to provide a technique which is compatible with the VRML and MPEG-4 standards.

15 These objectives and others that will become more clearly apparent in what follows have been achieved with the help of a data signal for modification of a graphic scene, intended for means of constructing images that can be shown on at least one screen, said signal comprising frames for up-dating the graphic
20 scene, certain of said frames comprising a command for the replacement of the existing graphic scene by a new graphic scene.

Hence, the up-date commands comprise, according to the invention, a new command that allows complete replacement of
25 one scene by another to be carried out. This aspect rests on a completely novel approach to the animation. In effect, the man skilled in the art has always considered that there was only one single scene (the original scene) that had to be changed as one goes along, by acting on elements of the scene.

30 According to the invention a higher level is arrived at in which one does not consider that there is only one scene. It is there proposed that in a single operation one is able to change the whole of the scene. This enables one to provide notably new applications which have not been considered and which
35 are impossible with the previous techniques, such as

broadcasting by digital television, techniques known as "multicast" (for example on the Internet) and services referred to as "push" services.

For example, the invention allows the momentary
5 replacement of a "video" scene, such as a film, by an
"interactive advertising" scene, without waiting for a request
from the user.

Advantageously, certain of said frames also carry at least
one of the commands belonging to the group comprising the
10 following commands:

- insertion of an element of said graphic scene
- modification of an element of said graphic scene
- deletion of an element of said graphic scene

said means of construction up-date said scene in relation
15 to said up-date frames.

The operations for modifying a graphic scene are hence
very simple, and demand little in transmission resources. This
signal can therefore be transmitted on low bit rate networks
and do not require large means in the terminals that receive
20 them.

By an "element" one understands notably the objects or
nodes, the fields of a node, the values of a field, the connections
between two fields and the complete scene.

Hence, said commands for insertion of an element can
25 include commands for the insertion of at least one of the
elements belonging to the group comprising:

- insertion of a new object
- insertion of a new value into an existing vector (or
multiple) field;
- 30 - insertion of a new connection between two fields of two
existing objects ("ROUTE").

Similarly, said commands for deletion of an element can
include commands for deletion of at least one of the elements
belonging to the group comprising:

- 35 - deletion of an existing object

- deletion of a value in an existing vector field;
- deletion of an existing connection between two fields of two existing objects ("ROUTES").

Said commands themselves for replacement of an element
5 can include commands for replacement of at least one of the elements belonging to the group comprising:

- replacement of an existing object by a new object;
- replacement of a characterization field of an object by a new characterization field;
- 10 - replacement of a value of a characterization vector field;
- replacement of an existing connection between two fields of two existing objects ("ROUTE");
- replacement of a graphic scene.

According to one advantageous embodiment of the
15 invention, said commands comprise:

- a first field designating the type of command, among at least certain of the following types : insertion, deletion, replacement and graphic scene replacement;
- a second field designating the type of element concerned, among the following elements, according to the type of command : object, field, value of vector field and connection;
- a third field defining the elements concerned.

The invention also concerns a method of transmission of
25 such a signal. This method comprises notably a step of updating said graphic scene, in which one provides the transmission of frames for up-dating said graphic scene, carrying at least one of the commands belonging to the group comprising the following commands:

- 30 - insertion of an element of said graphic scene;
- modification of an element of said graphic scene;
- deletion of an element of said graphic scene
- replacement of the graphic scene.

Similarly, the invention relates to a device for the
35 restitution of a graphic scene, intended to be shown on at least

one screen, comprising means for up-dating said scenes, from frames for up-dating said graphic scene, carrying at least one of the commands belonging to the group including the following commands:

- 5 - insertion of an element of said graphic scene;
- modification of an element of said graphic scene;
- deletion of an element of said graphic scene
- replacement of the graphic scene.

Other characteristics and advantages of the invention will
10 more clearly become apparent on reading the following
description of a preferred embodiment of the invention, given
by way of a simple illustrative and non-limitative example, and
 appended drawings, in which :

- 15 - Figure 1 illustrates the general principle of
implementing the invention;
- Figure 2 shows, in a diagrammatic manner the structure
of an up-date frame according to the invention;
- Figure 3 shows the detail of the semantics of the
elementary commands of the frame in Figure 2;
- 20 - Figure 4 shows a first example of use of the technique
of the invention;
- Figure 5 describes a second example of use of the
technique of the invention;
- Figure 6 illustrates an example of use of the scene
25 replacement command of the invention.

Therefore, Figure 1 shows an outline of a terminal, for
example, compatible with the MPEG-4 standard and taking into
account the signal, or flow, for scene modification of the
invention.

30 This terminal comprises means 11 of creating the original
scene, from a data stream 12, in BIFS format. In other words,
the terminal loads the graphic scene. This is described in terms
of objects or nodes.

It will be recalled that the aim of the BIFS scene
35 description format is to describe the space-time relationships

between the graphic objects of a scene. To do this, the BIFS format defines a certain number of "nodes" representing all the graphic primitives that one wishes to be able to represent.

The nodes are entities which represent a graphic primitive.

5 For example, the Sphere, Cone, Transform etc. nodes can be defined. Each of the nodes have a characterizing field and which is sent in the scene description just after the declaration of the node.

Some of the nodes are referred to as being able to be referenced, a single identifier is brought together with said node. Certain of the fields are declared as being capable of being modified from outside, others as being of fixed values. The modifiable values will be able to be reached by the update mechanism of the invention.

10

15 Finally the descriptions in BIFS and VRML format also include particular entities called "ROUTES". The "ROUTES" are the declarations which permit one, in the scene description language, to specify the passage of events between two fields of two nodes of the scene.

20 According to the invention, certain of these nodes can be declared as modifiable nodes, which will allow then to be modified in the future. This can be expressed by the "DEF" mechanism in VRML, and a similar mechanism in the MPEG-4 system.

25 Once this scene is loaded, either through a request from the user (interactive mode) or in an automatic way at a certain instant (passive mode, also called a "push model"), an up-date frame 13, called "BIFS-update", can be loaded in order to modify one or more elements of the scene if necessary.

30 The modification is provided by the decoder 14, which receives the frame 13 and which carries out the corresponding commands.

Hence an animated image 15 is obtained that can be shown (16) to the user. If the need arises, this can intervene (17) with

the help of a suitable interface. This intervention brings about a new modification if the need arises.

Each modification command can have 4 basic forms :

- insertion of a field
- modification of a field
- deletion of a field
- replacement of the entire scene

Each elementary command can be applied either to a single node, a vector or a simple field or to a "ROUTE". A fourth command is provided for the complete replacement of a scene. This command, essential according to the invention, is described in greater detail below.

Therefore, the following modification commands are provided :

15 Insertion commands :

- to insert a new node into an existing family of nodes ("grouping node"). The identifier is supplied of the node of the "grouping node" type into which a new node "NodeId" must be inserted. Then there are three choices for inserting a new node : it is inserted either at the end of the "children" field of the "grouping node", at the beginning, or at a certain position marked by its index Index. Finally, the value of the new node to be inserted is sent.
- to insert a new value into a multiple field. The identifier "Id" of the node to be modified, the index of the field concerned by the modification, marked by "fieldNb" are supplied. Then there are three choices for inserting a new value : this is inserted either at the end of the multiple field, at the beginning, or at a certain position marked by its index Index. Finally, the value to be inserted is sent. This value can be a new node or a new value for any type.
- to insert a new "ROUTE". This "ROUTE" is specified by the specification of the starting node marked by "id1"

and the field concerned “field1” and of the node marked by its identifier “id2” and the field to be modified “field2” in this node.

Deletion commands

- 5 - a node can be deleted by giving its identifier “id”.
- it is also possible to delete a particular value of a multiple field, also called an indexed value (“idxValue”). To do this, as previously, the identifier of the node to be modified, id, and the field concerned by the modification marked by “fieldNb” are supplied. Finally, a certain position is sent that is marked either by its index Index or by the fact that it is the first of the multiple field, or by the fact that it is the last of the multiple field.

10

- 15 - finally a “ROUTE” can be deleted by indicating its identifier “RouteId”

Value replacement commands

- it is possible to replace a node by supplying its identifier “Id” followed by the new value of the node.
- 20 - a specific field of a given node can be replaced. To do this, the identifier of the node to be modified “Id” and the field concerned by the modification marked by “FieldNb” must be supplied. This field can itself be a new node, a multiple value field or a simple value field.
- 25 - it is also possible to modify a specific value of a multiple field. To do this, one sends the identifier of the node to be modified “Id”, and the field concerned by the modification marked by “FieldNb”, and finally the position in the multiple field marked, either by its index “Index”, or by the fact that it is the first of the multiple field, or by the fact that it is the last of the multiple field. Then, the new value of the field is sent.
- 30 - It is finally possible to modify a “ROUTE”, by sending its identifier, followed by the new “ROUTE” as specified in the preceding paragraphs.

35

Scene replacement command : finally it is possible to replace the entire scene by simply giving the new value of the total scene.

5 The frame “BIFS-update” 13 can therefore be constructed according to the diagram in Figure 2. It comprises an up-date command 21, followed by a “continuous” indicator 22, having the value (for example) “0” if there is no further command to follow in the frame, and having the value “1” if not (in the example).

10 The syntax of the elementary commands can, for example, be that illustrated in Figure 3.

At a first level 31, a specific code is associated to the four types of command, for example :

15

- 0 : insertion (insert);
- 1 : deletion (delete);
- 2 : replacement (replace);
- 3 : scene replacement (replacescene).

At a second level 32, a specific code is given to each type of element concerned.

20 Hence for the insertion or the clearing, there are:

- 0 : insertion of an object (node);
- 1 : insertion of a value into a vector field (IdxValue)
- 2 : insertion of a “ROUTE”.

For the replacements there are:

25

- 0 : replacement of an object (node);
- 1 : replacement of a field (FieldValue);
- 2 : replacement of a parameter of a vector field (IdxValue);
- 3 : replacement of a “ROUTE”.

30 Finally, at a third level 33, the precise parameters of each element concerned are made clear. Hence one indicates, in the way already described above:

35

- insertion of an object : new identifier for the object, and a list of fields, in accordance with the structure described above;

- insertion of parameters : identifiers of the node (nodeId) and of the field (fieldNb), and the position for the insertion, in the form:
 - code: - 0: start (first value);
 - 1: index of the value
 - 2: end (final value),
 - corresponding value (value).
- insertion of a “ROUTE” : identifier of the source node (id1), of the field of the source node (field 1), identifier of the destination node (id2), field of the destination node (field 2);
- clearing of a parameter : identifiers of the node, the field, index and possibly location of the deletion;
- replacement of an object : identifier of the object, new value of the object;
- replacement of a field : identifiers of the node and of the field, new value of the field;
- replacement of a parameter : identifiers of the node and of the field, index of the parameter, new value;
- replacement of a “ROUTE” : identifier of the “ROUTE”, identifiers of the source node and of the source field, identifier of the destination node and of the destination field;
- replacement of a scene : value of a new scene.

It should be noted that the proposed structure allows one to encode the first level 31 on only 2 bits and the second level 32 on only 2 bits.

Figure 4 illustrates a first example of use of the proposed modification technique according to the invention, in the context of a tele-sales application. On initialization, the users 41 and 42 are connected with one another on the application server 43, via their multimedia terminals 44 and 45. The server 43 shows them a virtual shop for example.

The update server 46, informed of this connection, can then send graphic advertising messages, in the form of “added

objects" in order to give information about the latest promotions. The added objects then appear in the scene shown on the terminals. Similarly, it is possible to delete an object (corresponding for example to an object withdrawn from sale) or to modify an element of the scene whatsoever.

Figure 5 illustrates another application of the invention, namely interactive teaching. The user of this remote teaching application loads an initial scene from his CD-Rom 51, restituted by the scene decoder 52.

10 Next, a teacher or other students connected to the network cause new data in Table 53 to appear in order to illustrate the course, by using the "BIFS-Update" representation according to the invention. These new data are decoded by the "update" flow decoder 54.

15 An example of scene modification data flow will now be described in detailed fashion. In this example, one displays a cube at the initial moment animated when the user clicks onto the object. Next one inserts a sphere. Then the interpolation of the positions is changed so that it relates to the sphere. Finally 20 the cube is deleted from the scene.

This example is given in VRML format but may easily be transcribed into BIFS in its binary version. The original scene is given by:

DEFT Transform{

25 translation 0 0-5

children[

DEFTOUCH TouchSensor{}

Shape{

appearance Appearance{

30 material DEFM Material{

diffuseColor 0.5 0 0

}

geometry DEF CUBE Cube{

size 1 1 1

}

```

        }
    ]
}

DEFTIME TimeSensor
5 DEFINTER CoordinateInterpolator
{
    key          [0.0,1.0]
    keyValue     [-505,50-5]
}
10 ROUTETOUCH.touchTime TO TIME.startTime
ROUTETIME.fraction TO INTER.keyValue
ROUTEINTER.value changed TO T.translation

```

A remote user can then modify the scene in the following manner:

15 .Add an object (sphere):

```

0           Insertion command
0           An object in a “grouping” node is inserted
T           The object T is added
2           This object is added at the end
DEF T2 Transform{
    translation 10 10 0   New node transform containing a sphere is
                           added
    children[
        Shape{
            geometry Sphere{}
        }
    ]
}

```

.Modification of a “ROUTE”

```

2           Value replacement command
4           Replacement of a ROUTE
2           The route 2 is replaced (the third in the file)
INTER       One routes to the node “inter”
3           Field number 3 (value changed)
T2          Transformation T2
7           The translation of the Transform node

```

Hence the animation will now be directed to the new inserted sphere.

.Deletion of an object (the cube):

- 1 Deletion command
- 2 Deletion of the node
- CUBE The cube is deleted from the scene

As has already been indicated, the essential novelty of the
5 invention resides in the use of a command for the replacement
of the current scene by another, and in the discovery of the
necessity of such a command whereas the previous methods
only considered actions taken on a single scene.

In simplified applications, it should be noted in addition
10 that this scene replacement command can be the only one used.

By using the technique of the invention ("BIFS-Update"), it
is possible at any instant to connect into the scene modification
flow (as into a television channel). The scene replacement
15 commands then become access points which are random to the
flow (this notion can be compared to that of the "intra" frame
in video).

This replacement command allows one to use the signal of
the invention in the context of very broad applications, in
relation to known techniques, such as broadcasting applications
20 for digital television, the "multicast" techniques on the
"internet" and notably the services called "push" services. The
invention is also compatible with "pull" type services and
others.

Figure 6 illustrates an example, relating to broadcast
25 advertising. One wishes to replace the video scene 61 (a film)
momentarily by a new interactive advertising scene 62,
described in the form of a BIFS scene.

The scene replacement command RS 63 allows one to
impose the new scene on a user (without any action on the
30 latter's part). A new scene replacement command RS 64 allows
one to return to the video scene (or to a new scene).

CLAIMS

1. Data signal for modifying a graphic scene, an assembly of at least one graphic object, defined by at least one field, said objects corresponding to primitives used by the means of constructing an image to show said graphic scene on at least one screen, intended for image construction means that can be shown (16) on at least one screen, characterized in that said signal comprises frames for up-dating (13) the graphic scene, certain of said frames including a command (63, 64) for replacement of the existing graphic scene by a new graphic scene.

2. Signal according to Claim 1, characterized in that said frames (13) also carry at least one of the commands (21) belonging to a group comprising the following commands :

- insertion of an element of said graphic scene
- modification of an element of said graphic scene
- deletion of an element of said graphic scene

said means of construction up-dating said scene in relation to 20 said up-date frames.

3. Signal according to Claim 2, characterized in that said commands for insertion of an element include commands for the insertion of at least one of the elements belonging to the group comprising :

25

- insertion of a new object
- insertion of a new value into an existing vector field;
- insertion of a new connection between two fields of two existing objects ("ROUTE").

4. Signal according to any one of Claims 2 and 3, characterized in that said commands for the deletion of an element comprise deletion commands for at least one of the elements belonging to the group comprising :

- deletion of an existing object
- deletion of a value in an existing vector field;

- deletion of an existing connection between two fields of two existing objects ("ROUTES").

5. Signal according to any one of Claims 2 to 4, characterized in that said commands for the replacement of an element include commands for the replacement of at least one of the elements belonging to the group comprising :

- replacement of an existing object by a new object;
- replacement of a characterization field of an object by a new characterization field;
- replacement of a value of a characterization vector field;
- replacement of an existing connection between two fields of two existing objects ("ROUTE");
- replacement of a graphic scene.

10. Signal according to any one of Claims 1 to 5, characterized in that said commands comprise :

- a first field designating the type of command, among at least certain of the following types : insertion, deletion, replacement and graphic scene replacement;
- a second field designating the type of element concerned, among the following elements, according to the type of command : object, field, value of vector field and connection;
- a third field defining the elements concerned.

15. Method of transmission of data for up-dating a graphic scene intended to be shown (16) on at least one screen, characterized in that it comprises a step (13) of up-dating said graphic scene, in which one provides the transmission of frames for up-dating said graphic scene that carry at least one of the commands belonging to the group comprising the following commands :

- insertion of an element of said graphic scene
- modification of an element of said graphic scene
- deletion of an element of said graphic scene
- replacement (63, 64) of the existing graphic scene by a new graphic scene.

8. A device (16) for the restitution of a graphic scene, intended to be shown on at least one screen, characterized in that it comprises means of up-dating said scene, from frames (13) for up-dating said graphic scene, that carry at least one of
5 the commands belonging to the group comprising the following commands :

- insertion of an element of said graphic scene;
- modification of an element of said graphic scene;
- deletion of an element of said graphic scene;

10 - replacement (63, 64) of the existing graphic scene by a new graphic scene.

ABSTRACT OF THE DISCLOSURE

Data signal for modification of a graphic scene with corresponding method and device

The invention relates to a data signal for the modification of a graphic scene, intended as means for the construction of images that can be shown on at least one screen, that comprise frames for up-dating the graphic scene, certain of said frames carrying a command for replacement of the existing graphic scene by a new graphic scene. Advantageously, they also carry at least one of the commands belonging to a group including the following commands:

5
10
15

- insertion of an element of said graphic scene
- modification of an element of said graphic scene
- deletion of an element of said graphic scene

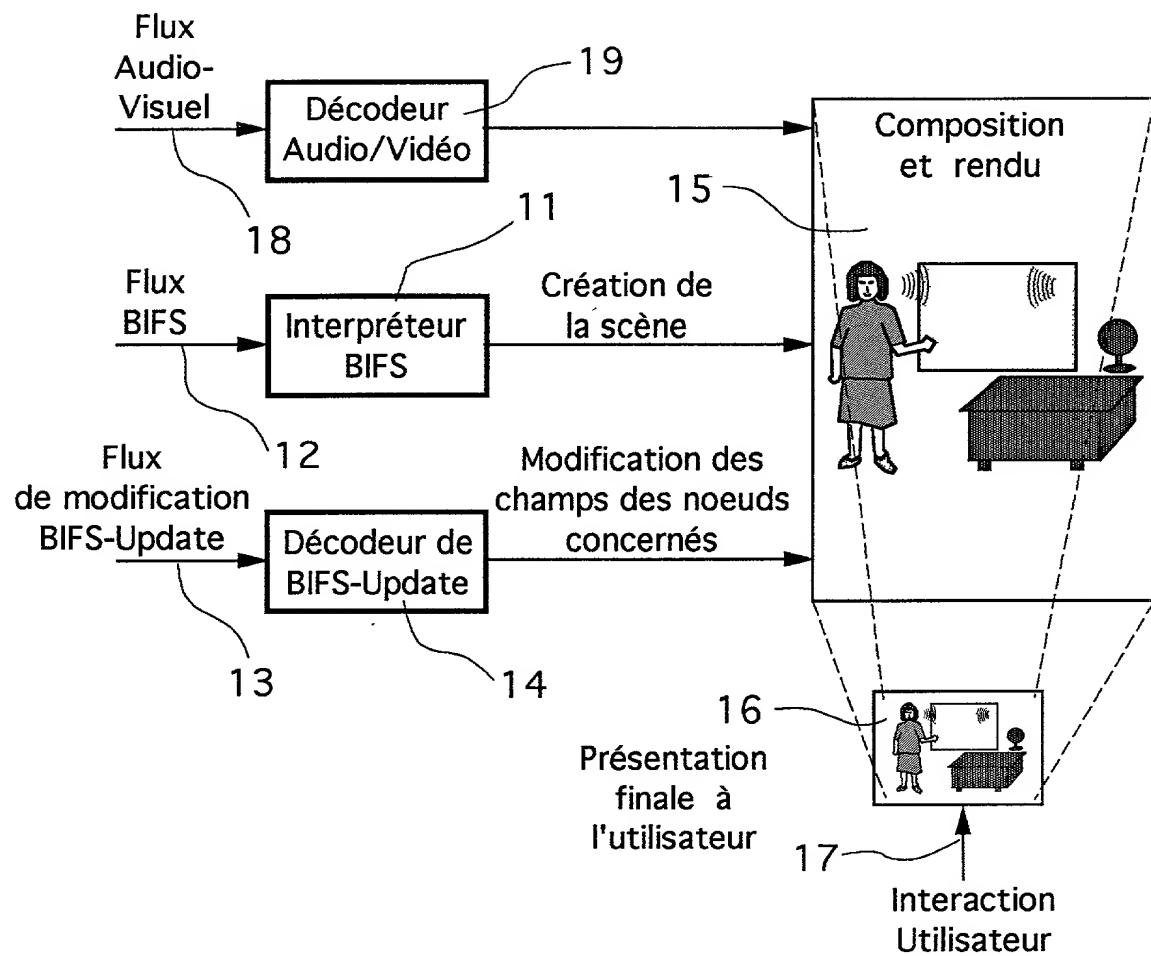
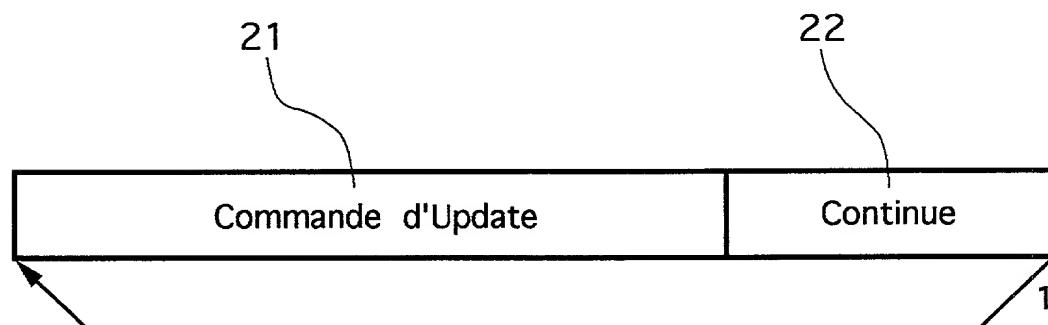
said means of construction up-dating said scene in relation to said up-date frames.

The invention also relates to a corresponding method and
15 device.

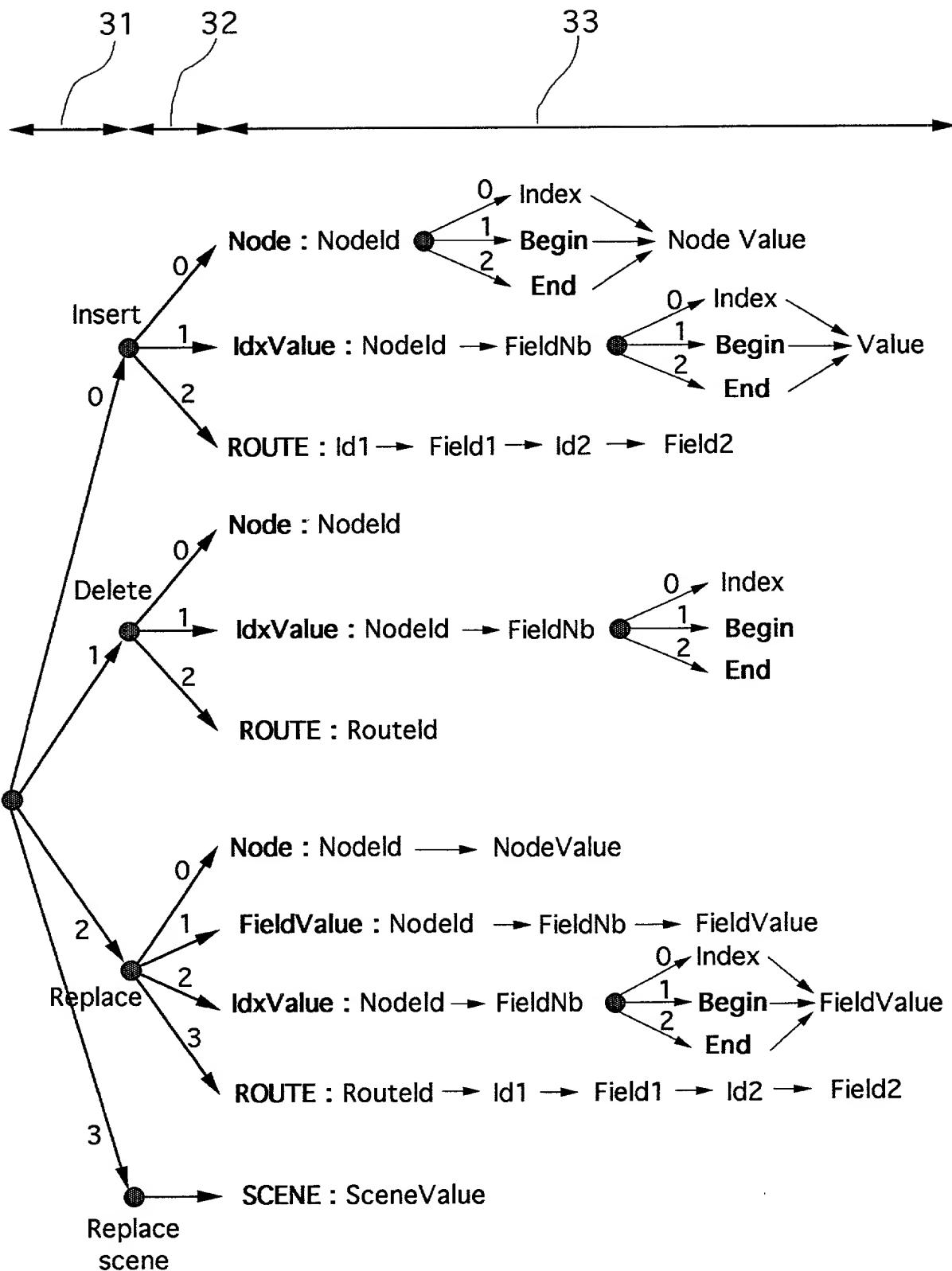
Figure 3

"Express Mail" mailing label number EL415941730US
Date of Deposit JANUARY 7, 2000
I hereby certify that this paper or fee is being deposited
with the United States Postal Service "Express Mail Post
Office to Addressee" service under 37 CFR 1.10 on the
date indicated above and is addressed to the Commis-
sioner of Patents and Trademarks, Washington, D.C. 20231
LINDA MC CORMICK
printed name
Linda MC Cormick
Signature

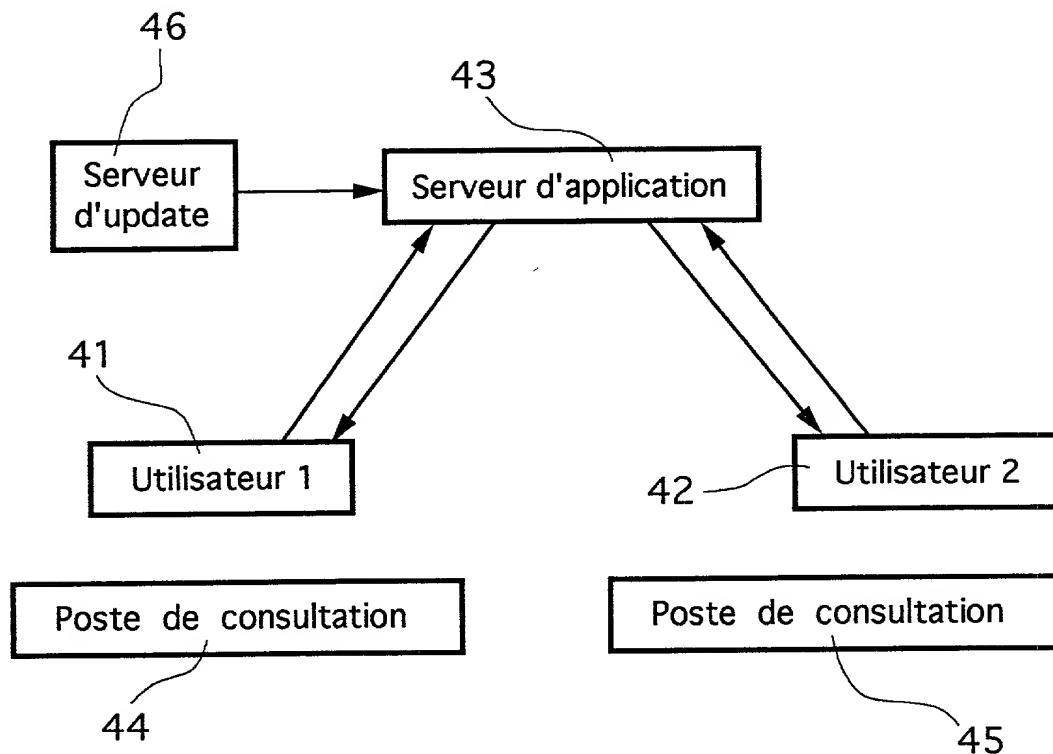
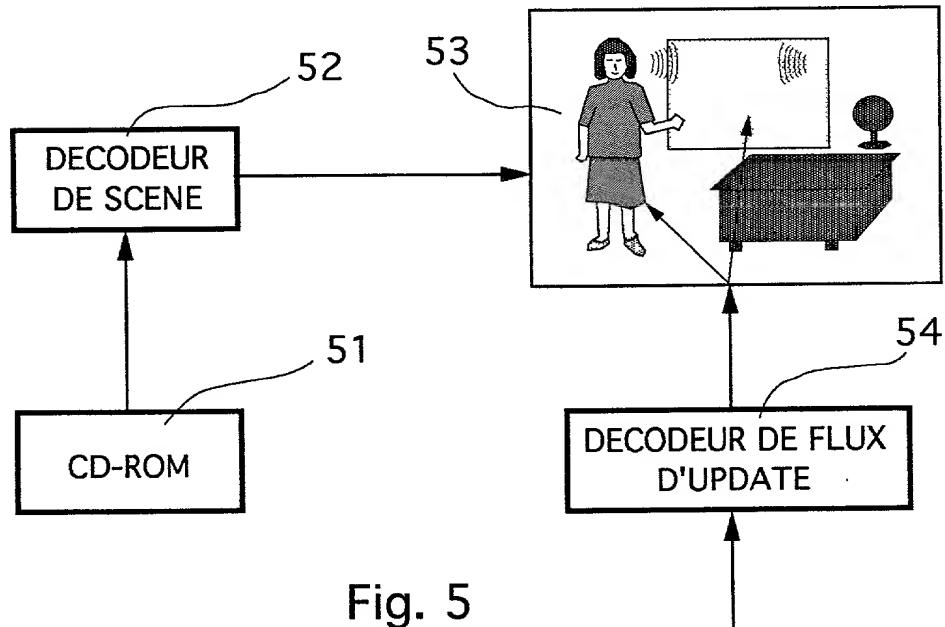
1/4

Fig. 1Fig. 2

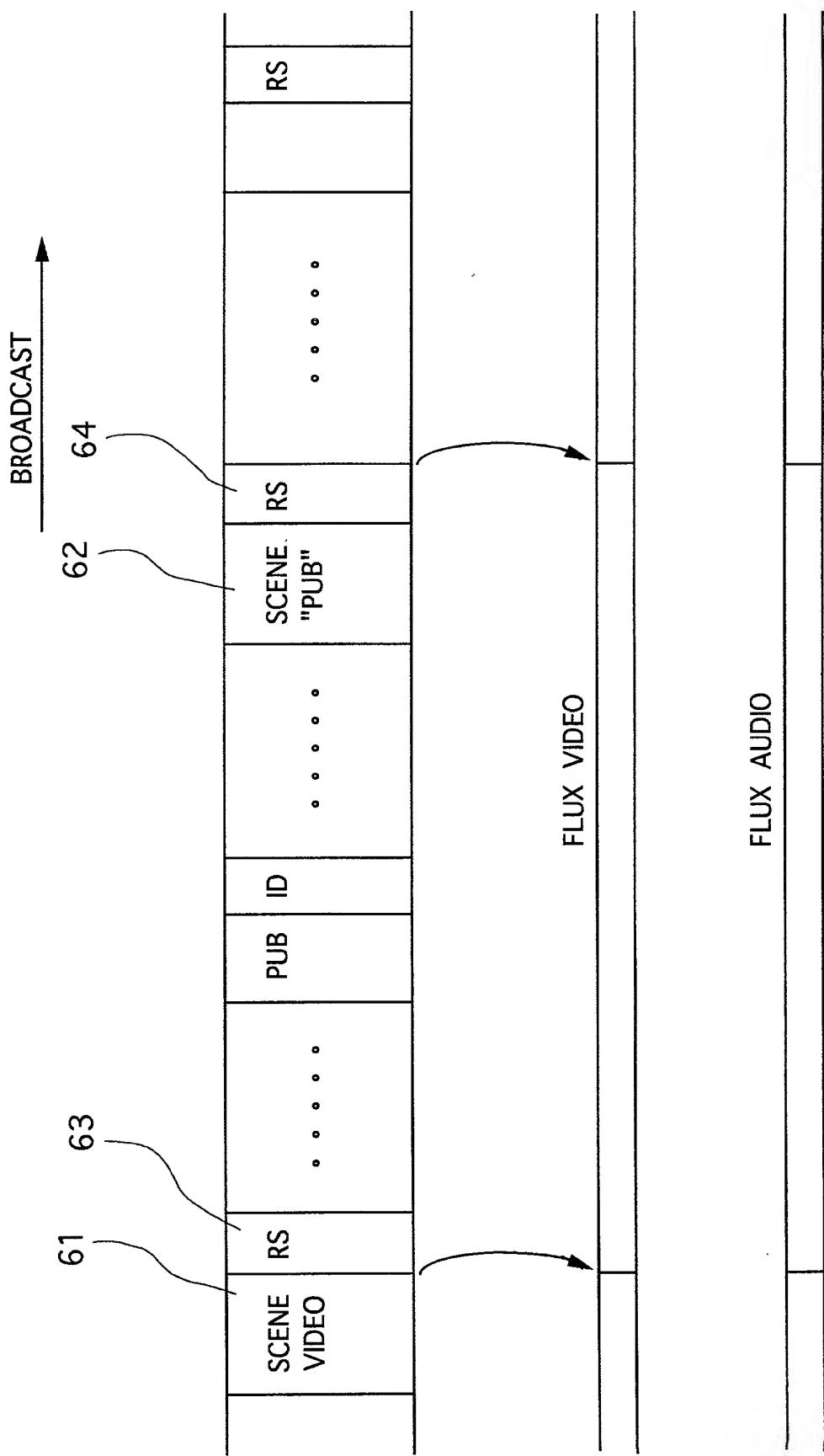
2/4

Fig. 3

3/4

Fig. 4Fig. 5

4/4

Fig. 6

United States Patent Application

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: DATA SIGNAL FOR MODIFICATION OF A GRAPHIC SCENE WITH CORRESPONDING METHOD AND DEVICE

The specification of which

- a. is attached hereto
- b. was filed on January 7, 2000 as application serial no. and was amended on (if applicable) (in the case of a PCT-filed application) described and claimed in international no. PCT/FR98/01520 filed July 10, 1998 and as amended on (if any), which I have reviewed and for which I solicit a United States patent.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (attached hereto).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

- a. no such applications have been filed.
- b. such applications have been filed as follows:

FOREIGN APPLICATION(S), IF ANY, CLAIMING PRIORITY UNDER 35 USC § 119			
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)
France	PCT 97 09120	July 11, 1997	
ALL FOREIGN APPLICATION(S), IF ANY, FILED BEFORE THE PRIORITY APPLICATION(S)			
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)

I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

U.S. PROVISIONAL APPLICATION NUMBER	DATE OF FILING (Day, Month, Year)

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

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Gresens, John J.	Reg. No. <u>33,112</u>	Vandenburgh, J. Derek	Reg. No. <u>32,179</u>
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Kowalchyk, Alan W.	Reg. No. <u>31,535</u>		
Kowalchyk, Katherine M.	Reg. No. <u>36,848</u>		

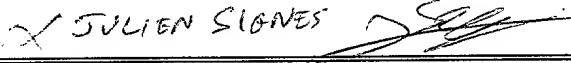
78

I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Merchant & Gould P.C. to the contrary.

Please direct all correspondence in this case to Merchant & Gould P.C. at the address indicated below:

Merchant & Gould P.C.
3100 Norwest Center
90 South Seventh Street
Minneapolis, MN 55402-4131

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2	Full Name Of Inventor	Family Name Julien	First Given Name Signes	Second Given Name M
0	Residence & Citizenship	City Rennes	State or Foreign Country France FRX	Country of Citizenship France
1	Post Office Address	Post Office Address 2, Quai de Richemont	City Rennes	State & Zip Code/Country 35700 / France
Signature of Inventor 201: 			Date:	JAN 22 2000

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)–(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim;
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

- (c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:
 - (1) Each inventor named in the application;
 - (2) Each attorney or agent who prepares or prosecutes the application; and
 - (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.
- (d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.